

Alcohol: Is This Right?

Name _____ Date _____

Please circle whether you agree or disagree with each statement.

1. Alcohol is a stimulant.
Agree Disagree
2. Caffeine will sober you up.
Agree Disagree
3. Food will keep you from becoming intoxicated.
Agree Disagree
4. Drinking beer is safer than drinking wine or hard liquor such as vodka or whiskey.
Agree Disagree
5. Alcohol-related car crashes are all caused by drunk drivers.
Agree Disagree
6. Alcoholism is a disease.
Agree Disagree
7. Alcohol abuse and alcoholism affect only the abuser.
Agree Disagree
8. Alcohol abuse or alcoholism will never be my problem.
Agree Disagree
9. Nothing can be done about alcohol abuse or alcoholism.
Agree Disagree
10. It is a good idea to drink alcohol to prevent heart disease.
Agree Disagree
11. Drinking a large amount of alcohol occasionally is less harmful than drinking a smaller amount every day.
Agree Disagree
12. Drinking alcohol makes you feel more confident.
Agree Disagree

What Is a Drink?

Name _____

Date _____

Calculate the total amount of alcohol in a typical serving of the following alcoholic drinks.

Type of drink	Volume of serving (in ounces)	Concentration of alcohol expressed as a percent	Concentration of alcohol expressed as a percent in decimal form	Total amount of alcohol (in ounces)
Beer	12	5	0.05	
Wine	5	12	0.12	
Hard liquor	1.5	40	0.40	

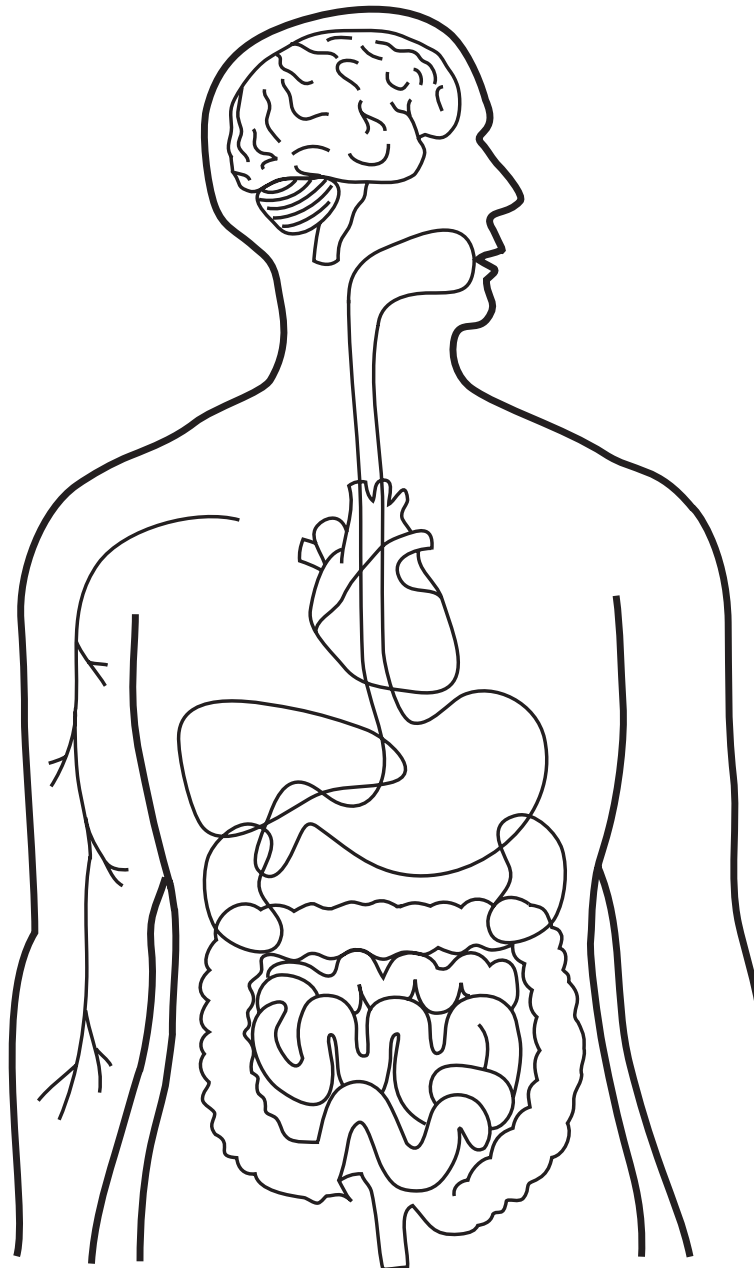
The amount of alcohol in a drink can be calculated by multiplying the volume of the drink by the percentage of alcohol it contains. Remember to express percentage of alcohol in its decimal form before doing the multiplication. For example, 5% = 0.05 when expressed as a decimal.

$$\begin{array}{ccccc}
 \text{Volume} & & \text{Percentage} & & \text{Total Amount of Alcohol} \\
 \text{of} & & \text{of} & & \text{in} \\
 \text{Serving} & \times & \text{Alcohol} & = & \text{Serving} \\
 & & \text{(in decimal form)} & &
 \end{array}$$

Answer the following questions.

1. Which contains more alcohol, a 12-ounce bottle of beer that is 5 percent alcohol or 1 ounce of whiskey that is 50 percent alcohol? Show your calculations.
2. Based on your calculations, is it safer for a person to drink beer than it is to drink whiskey?

Tracing Alcohol's Path through the Body



Study 1—Effect of Alcohol Dose on Mouse Movement

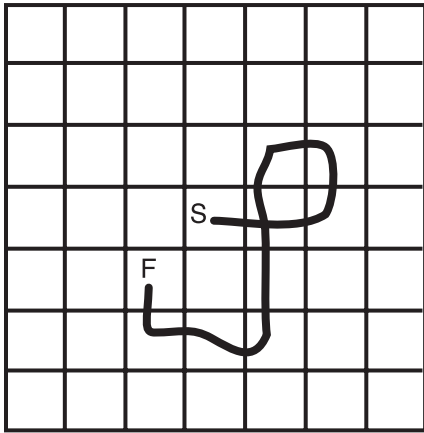


This study investigates the effect of different levels of alcohol consumption on the activity (movement) of mice. The experiment begins by placing a control mouse that has not been exposed to alcohol on the center square (labeled “S” for start) of a grid pattern. This is time zero. The mouse is observed for one minute. The movement of the mouse during this minute is shown by a line on the grid pattern.

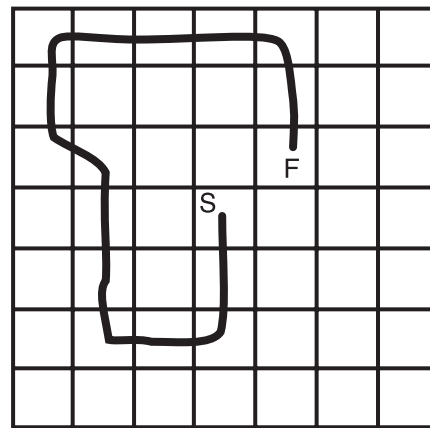
To collect your data, count the number of grid lines crossed by the mouse during the one minute of observation and record that number in the space provided on Master 3.3, *Study 1—Worksheet and Graph Template*. Repeat this process for the remaining three mice that have been given alcohol to levels of 1.5, 2.0, and 3.0 grams of alcohol per kilogram of body weight, respectively. In each case, the activity patterns for these mice were obtained 10 minutes after the mice had been given the alcohol.

Study 1—Mouse Movement Data

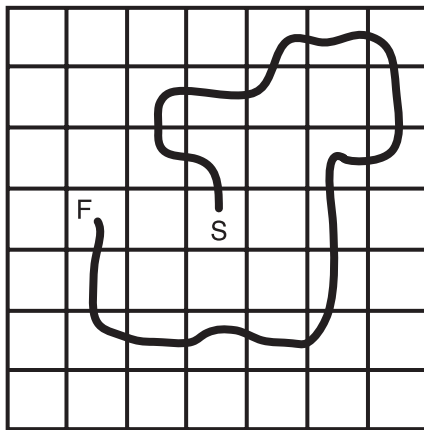
Count the number of grid lines crossed by each mouse and record those numbers on Master 3.3, *Study 1—Worksheet and Graph Template*. Note that “S” indicates “start” and “F” indicates “finish.”



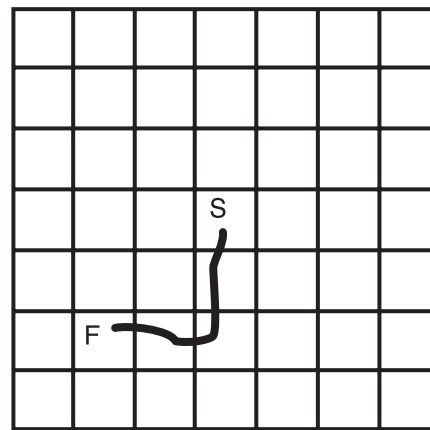
no alcohol



1.5 g alcohol/kg body weight



2.0 g alcohol/kg body weight

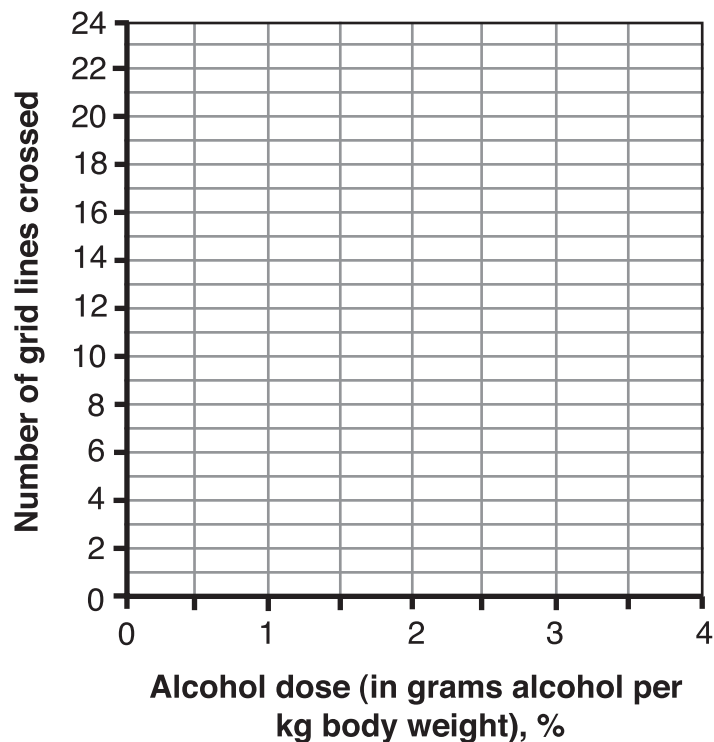


3.0 g alcohol/kg body weight

Study 1—Worksheet and Graph Template

Name _____ Date _____

Dose	Number of grid lines crossed
No alcohol	
1.5 g alcohol/kg body weight	
2.0 g alcohol/kg body weight	
3.0 g alcohol/kg body weight	



Study 2—Effect of Time on Alcohol Response

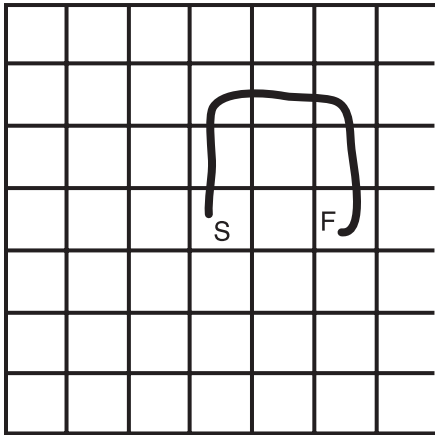


This study investigates the effect of time on the response of mice to alcohol consumption. The activity (movement) of a control mouse (unexposed to alcohol) is compared with that of a mouse that has been given alcohol to a level of 3 grams of alcohol per kilogram of body weight. Ten minutes after the alcohol is given, the mice are placed on the center square (labeled “S” for “start”) of a grid pattern. This is time zero. Each mouse is observed for one-minute intervals (from 0 to 1 minute, 5 to 6 minutes, 10 to 11 minutes, and 15 to 16 minutes). The movement of each mouse during these intervals is shown by a line on the grid pattern.

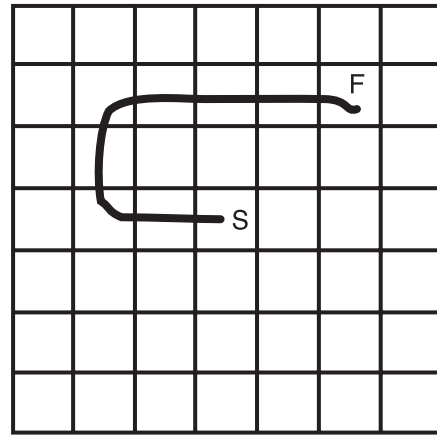
To collect your data, count the number of lines crossed by the control mouse during each one minute of observation and record those numbers in the spaces provided on Master 3.7, *Study 2—Worksheet and Graph Template*. Repeat this process for the experimental mouse that was given alcohol.

Study 2a—Control-Mouse Movement Data

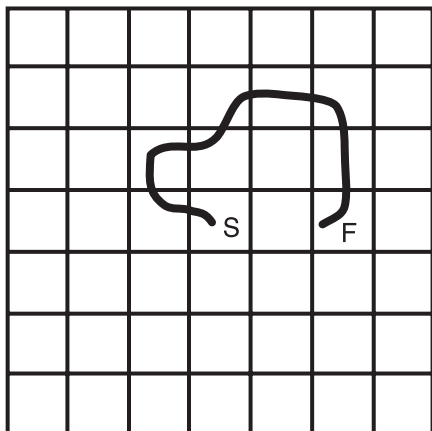
Count the number of grid lines crossed by each mouse and record those numbers on Master 3.7, *Study 2—Worksheet and Graph Template*. Note that “S” indicates “start” and “F” indicates “finish.”



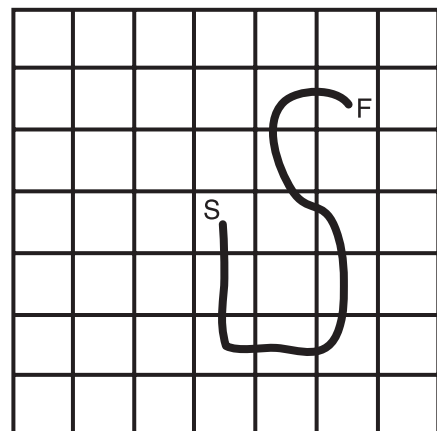
0 to 1 minute



5 to 6 minutes



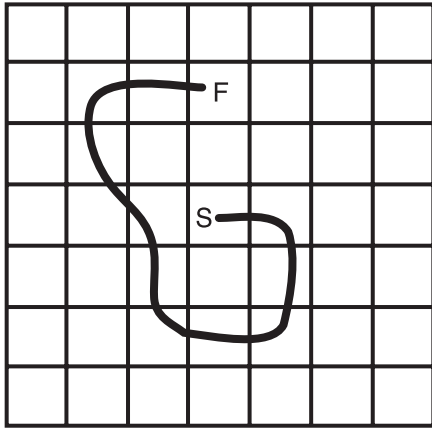
10 to 11 minutes



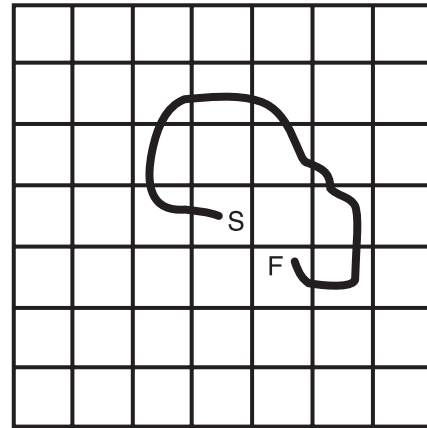
15 to 16 minutes

Study 2b—Experimental-Mouse Movement Data

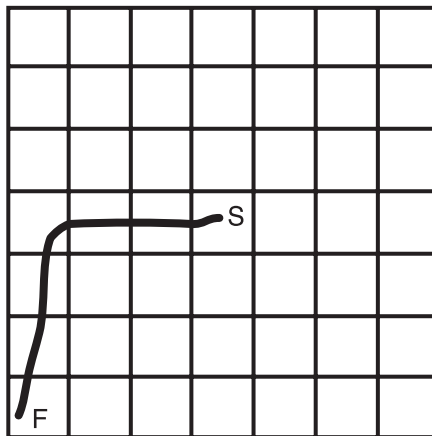
Count the number of grid lines crossed by each mouse and record those numbers on Master 3.7, *Study 2—Worksheet and Graph Template*. Note that “S” indicates “start” and “F” indicates “finish.”



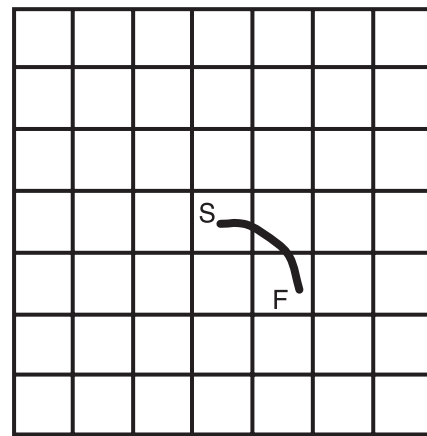
0 to 1 minute



5 to 6 minutes



10 to 11 minutes

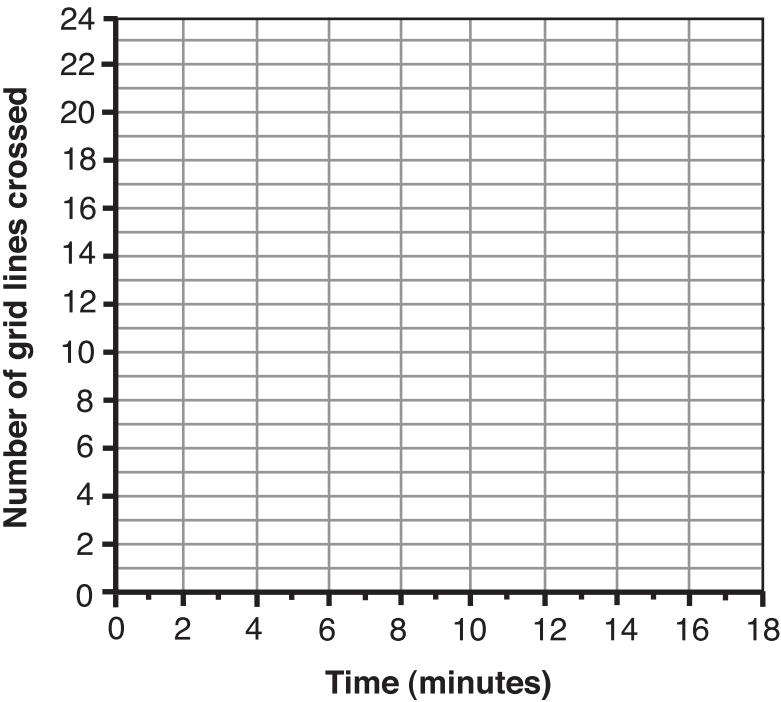


15 to 16 minutes

Study 2—Worksheet and Graph Template

Name _____ Date _____

Time intervals for control mouse	Number of grid lines crossed	Time intervals for experimental mouse	Number of grid lines crossed
0 to 1 min.		0 to 1 min.	
5 to 6 min.		5 to 6 min.	
10 to 11 min.		10 to 11 min.	
15 to 16 min.		15 to 16 min.	



Study 3—Effect of Genetics on Alcohol Response

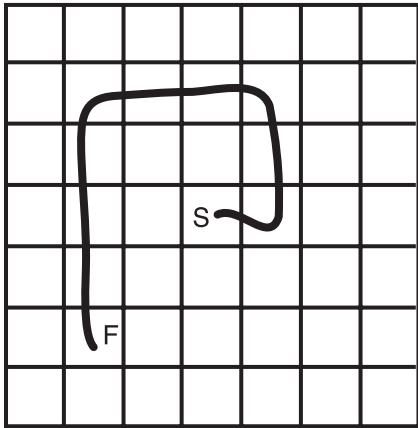


This study investigates the effect of genotype (genes) on the response of mice to alcohol consumption. Two strains of mice that have genetic differences are compared for their responses to alcohol. As in Study 1, a control mouse that has not been exposed to alcohol is placed on the center square (labeled “S” for “start”) of a grid pattern. This is time zero. The mouse is observed for one minute. The movement of the mouse during this minute is depicted by a line on the grid pattern.

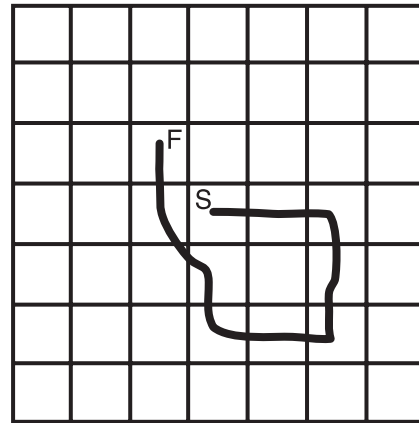
To collect your data, count the number of lines crossed by the mouse during the one minute of observation and record that number in the space provided on Master 3.11, *Study 3—Worksheet and Graph Template*. For the remaining three mice that have been given alcohol to levels of 1.5, 2.0, and 3.0 grams of alcohol per kilogram of body weight, respectively, repeat this process. These activity patterns were obtained 10 minutes after the mice had been given the alcohol. Be sure to collect data for both strains of mice (Studies 3a and 3b).

Study 3a—Mouse Movement Data

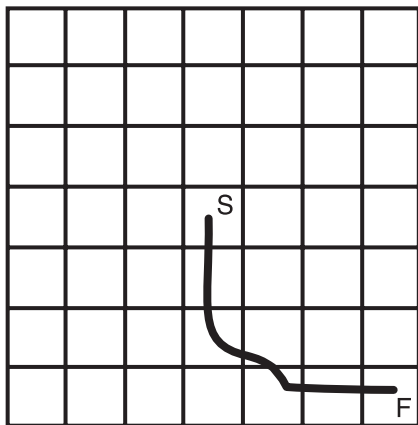
Count the number of grid lines crossed by each mouse and record those numbers on Master 3.11, *Study 3—Worksheet and Graph Template*. Note that “S” indicates “start” and “F” indicates “finish.”



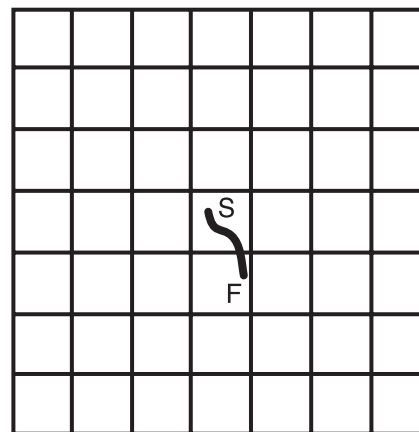
no alcohol



1.5 g alcohol/kg body weight



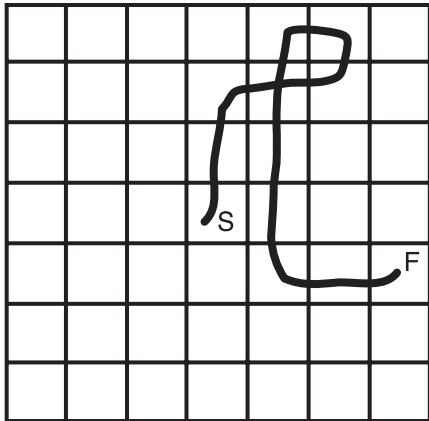
2.0 g alcohol/kg body weight



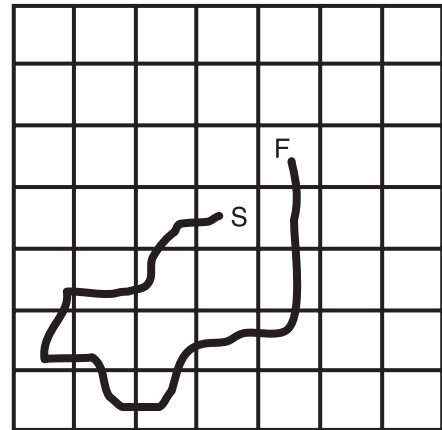
3.0 g alcohol/kg body weight

Study 3b—Mouse Movement Data

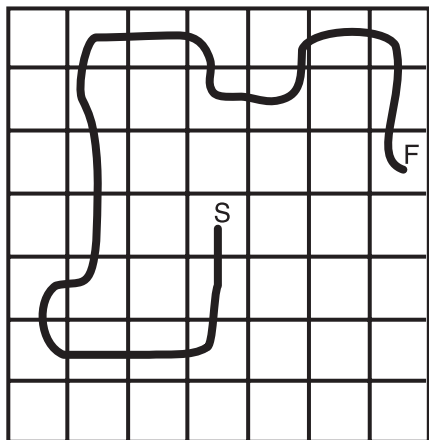
Count the number of grid lines crossed by each mouse and record those numbers on Master 3.11, *Study 3—Worksheet and Graph Template*. Note that “S” indicates “start” and “F” indicates “finish.”



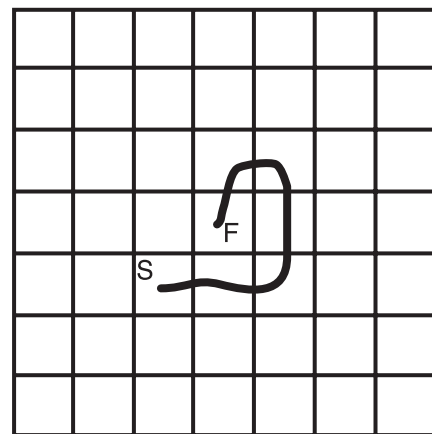
no alcohol



1.5 g alcohol/kg body weight



2.0 g alcohol/kg body weight

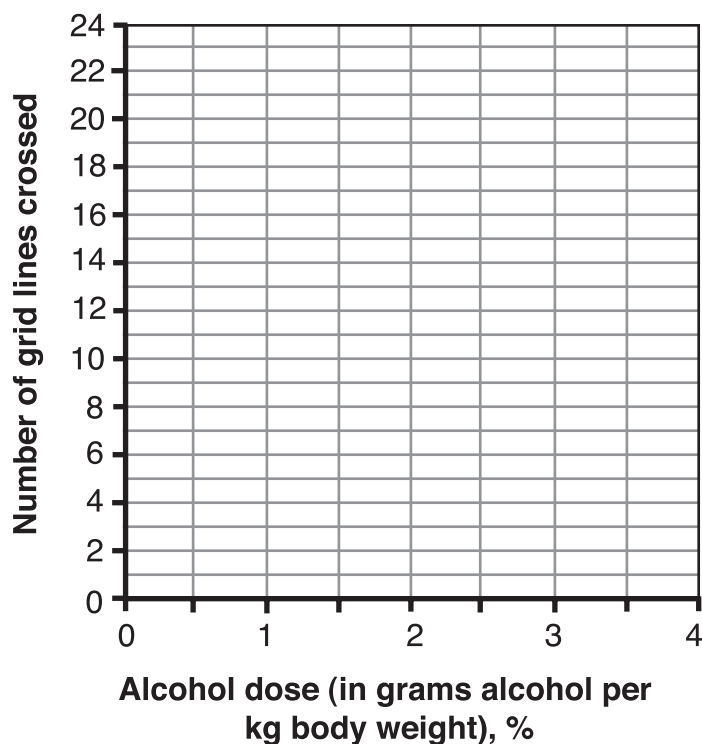


3.0 g alcohol/kg body weight

Study 3—Worksheet and Graph Template

Name _____ Date _____

Study 3a mice dose	Number of grid lines crossed	Study 3b mice dose	Number of grid lines crossed
No alcohol		No alcohol	
1.5 g alcohol/kg body weight		1.5 g alcohol/kg body weight	
2.0 g alcohol/kg body weight		2.0 g alcohol/kg body weight	
3.0 g alcohol/kg body weight		3.0 g alcohol/kg body weight	



Environmental Factors Influencing Alcohol Use and Nonuse

Name _____

Date _____

FICTITIOUS INDIVIDUAL #1

Availability factor Die roll _____ Score _____

Family environment factor Die roll _____ Score _____

Peer pressure factor Die roll _____ Score _____

Media pressure factor Die roll _____ Score _____

Legal restriction factor Die roll _____ Score _____

Add scores together for total score _____

FICTITIOUS INDIVIDUAL #2

Availability factor Die roll _____ Score _____

Family environment factor Die roll _____ Score _____

Peer pressure factor Die roll _____ Score _____

Media pressure factor Die roll _____ Score _____

Legal restriction factor Die roll _____ Score _____

Add scores together for total score _____

Score Sheet for Modeling Alcohol Use

AVAILABILITY FACTOR

Number on die	Score	Effect
Even	0	Alcohol not available
Odd	5	Alcohol available

FAMILY ENVIRONMENT FACTOR

Number on die	Score	Effect
Even	0	Alcohol use discouraged
Odd	10	Alcohol use not discouraged

PEER PRESSURE FACTOR

Number on die	Score	Effect
1 or 2	0	Peers don't use alcohol
3 or 4	5	Some peers use alcohol
5 or 6	10	Most peers use alcohol

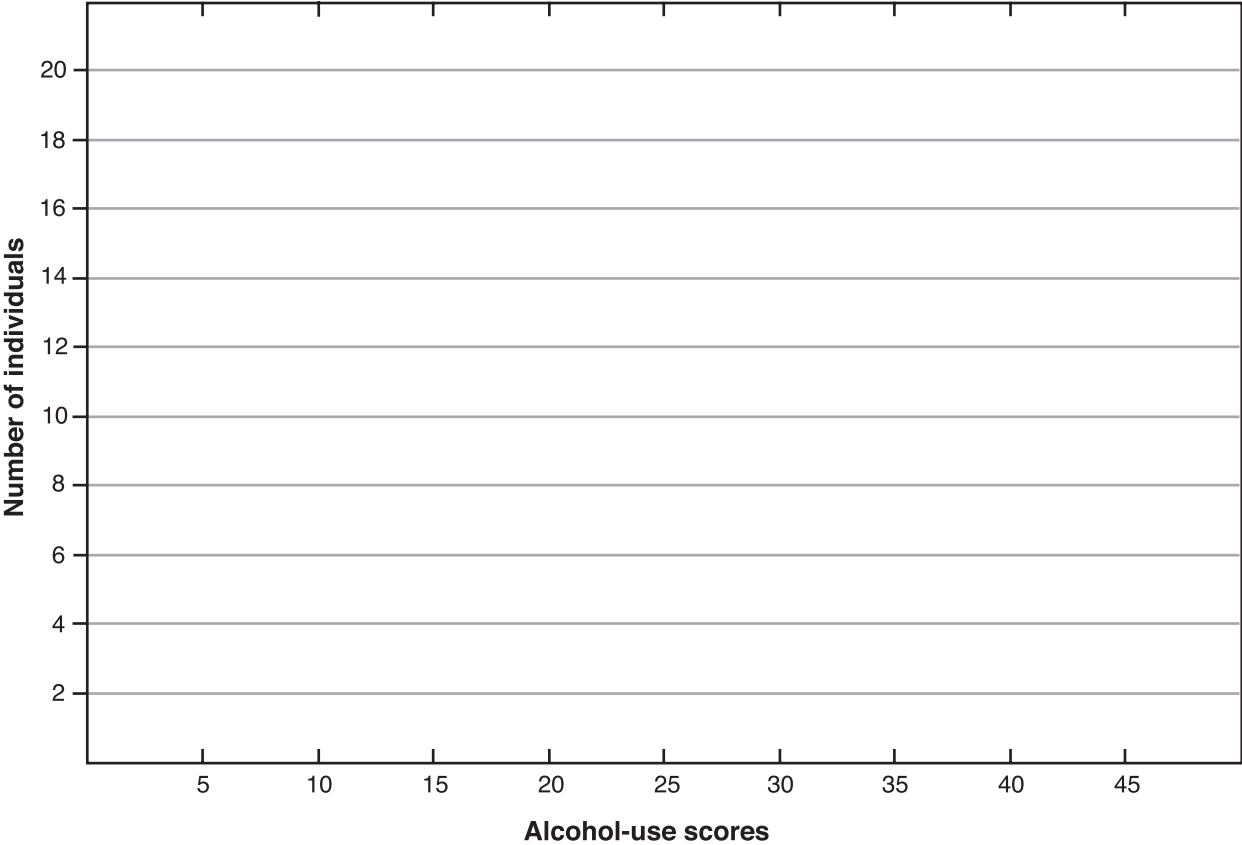
MEDIA PRESSURE FACTOR

Number on die	Score	Effect
1 or 2	0	Little influence to use alcohol
3 or 4	5	Moderate influence to use alcohol
5 or 6	10	Strong influence to use alcohol

LEGAL RESTRICTION FACTOR

Number on die	Score	Effect
Even	0	Choose to obey laws
Odd	10	Choose to disobey laws

Results for Modeling Alcohol Use



Modeling Genetic Influence

To model the genetic influence for an individual, follow the instructions below. This information is summarized in the accompanying table.

1. Roll the die. If an odd number turns up, then the genetic influence factor is 1. Do not roll again. If an even number turns up, then assign a value of 2 and roll again.
2. Roll the die a second time. If an odd number turns up, then assign a value of 1 and multiply the values of the two rolls to obtain the genetic influence factor:

$2 \text{ (first roll)} \times 1 \text{ (second roll)} = 2 = \text{genetic influence factor}$

If an even number turns up, then assign a value of 2 and multiply the values of the two rolls to obtain the genetic influence factor:

$2 \text{ (first roll)} \times 2 \text{ (second roll)} = 4 = \text{genetic influence factor}$

Roll of die	Number on die	Outcome
First roll	Odd	Genetic influence factor = 1
First roll	Even	Roll again
Second roll	Odd	Genetic influence factor = 2
Second roll	Even	Genetic influence factor = 4

3. Record genetic influence factor on Master 4.5, *Factors Influencing Alcohol Use and Abuse*.

Factors Influencing Alcohol Use and Abuse

Name _____

Date _____

FICTITIOUS INDIVIDUAL #1

Environmental factors (total score from Master 4.1): _____

Genetic influence factor _____

Multiply environmental factors times genetic influence factor to get total score:

Environmental factors x genetic influence factor = _____ total score

FICTITIOUS INDIVIDUAL #2

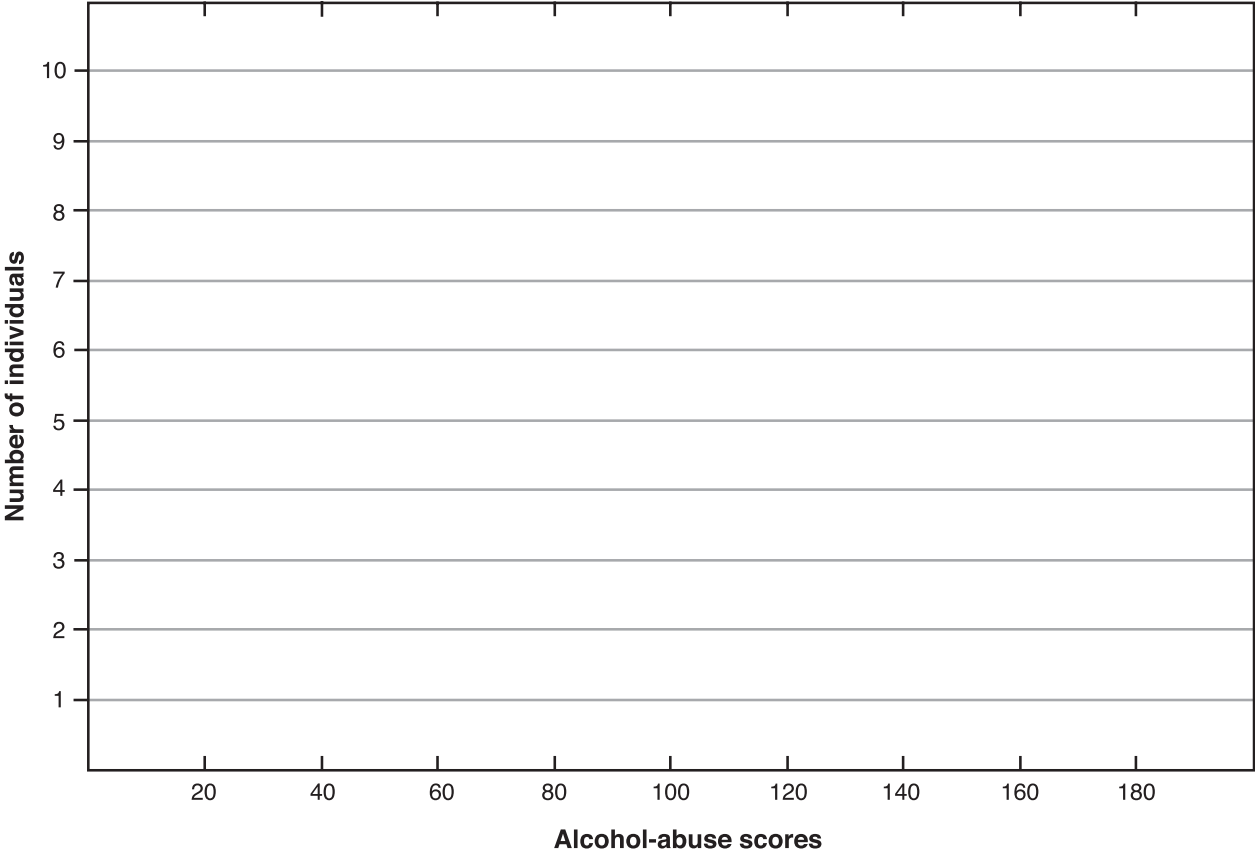
Environmental factors (total score from Master 4.1): _____

Genetic influence factor _____

Multiply environmental factors times genetic influence factor to get total score:

Environmental factors x genetic influence factor = _____ total score

Results for Modeling Alcohol Abuse



Factors Influencing Alcohol Abuse and Alcoholism

Name _____

Date _____

FICTITIOUS INDIVIDUAL # ____

Support system	Die roll _____	Score _____
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Loss of control	Die roll _____	Score _____
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Craving for alcohol	Die roll _____	Score _____
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Brain sensitivity to alcohol	Die roll _____	Score _____
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Genetic addictive factors	Die roll _____	Score _____
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Add together for total score _____

FICTITIOUS INDIVIDUAL # ____

Support system	Die roll _____	Score _____
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Loss of control	Die roll _____	Score _____
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Craving for alcohol	Die roll _____	Score _____
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Brain sensitivity to alcohol	Die roll _____	Score _____
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Genetic addictive factors	Die roll _____	Score _____
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Add together for total score _____

Score Sheet for Modeling Alcoholism

SUPPORT SYSTEM

Number on die	Score	Effect
1 or 2	0	Has been counseled for abuse
3 or 4	20	No abusers among family and peers
5 or 6	40	Associates with abusers

LOSS OF CONTROL

Number on die	Score	Effect
Even	0	Can control drinking
Odd	10	Cannot control drinking

CRAVING FOR ALCOHOL

Number on die	Score	Effect
Even	0	No craving for alcohol
Odd	10	Craving for alcohol

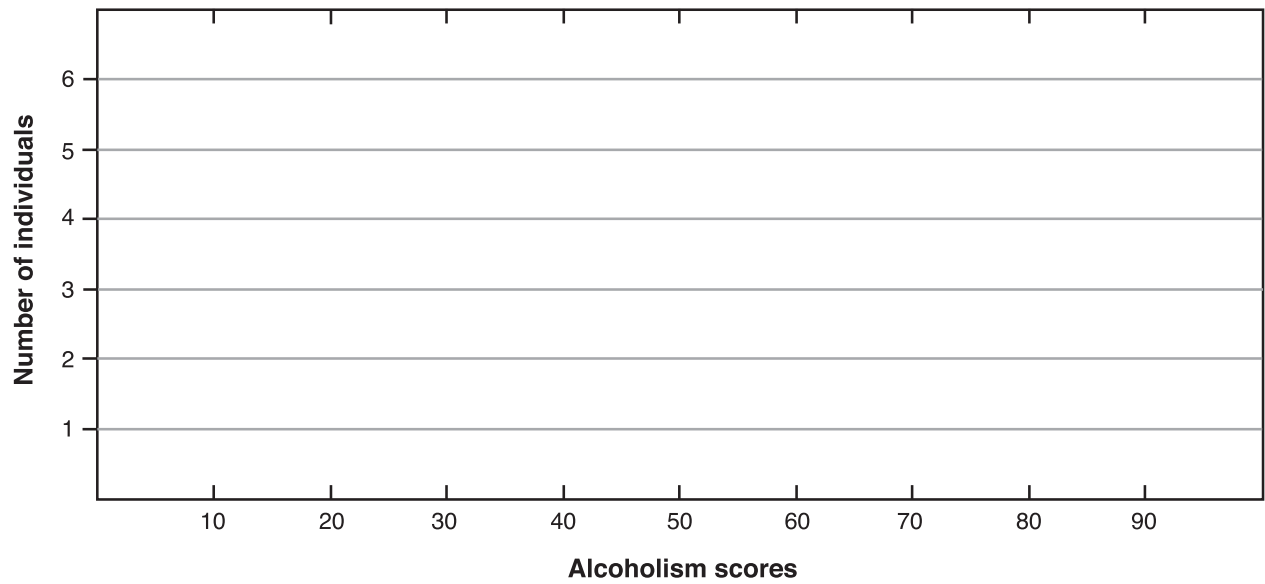
BRAIN SENSITIVITY TO ALCOHOL

Number on die	Score	Effect
Even	0	High sensitivity to alcohol
Odd	10	Low sensitivity to alcohol

GENETIC ADDICTIVE FACTORS

Number on die	Score	Effect
Even	0	No genetic addictive factors present
Odd	20	Genetic addictive factors present

Results for Modeling Alcoholism



When Is Alcohol Use a Problem?

Honest answers to the following four questions can help identify a potential drinking problem. A “yes” answer to one of the questions may suggest that a drinking problem exists, while more than one “yes” answer suggests that a drinking problem likely exists. The questions are written in such a way that the first letter of a key word in each question spells “CAGE.”

1. Have you ever felt that you should **C**ut down on your drinking?
2. Have people **A**nnoyed you by criticizing your drinking?
3. Have you ever felt bad or **G**uilty about your drinking?
4. Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover (**E**ye opener)?

Source: National Institute on Alcohol Abuse and Alcoholism. 1996. *Alcoholism: getting the facts*. Bethesda, MD: NIAAA.

Blood Alcohol Concentration Tables*

For Women

Drinks per hour	Body weight in pounds							
	100	120	140	160	180	200	220	240
1	0.05	0.04	0.03	0.03	0.03	0.02	0.02	0.02
2	0.09	0.08	0.07	0.06	0.05	0.05	0.04	0.04
3	0.14	0.11	0.10	0.09	0.08	0.07	0.06	0.06
4	0.18	0.15	0.13	0.11	0.10	0.09	0.08	0.08
5	0.23	0.19	0.16	0.14	0.13	0.11	0.10	0.09
6	0.27	0.23	0.19	0.17	0.15	0.14	0.12	0.11
7	0.32	0.27	0.23	0.20	0.18	0.16	0.14	0.13
8	0.36	0.30	0.26	0.23	0.20	0.18	0.17	0.15
9	0.41	0.34	0.29	0.26	0.23	0.20	0.19	0.17
10	0.45	0.38	0.32	0.28	0.25	0.23	0.21	0.19

For Men

Drinks per hour	Body weight in pounds							
	100	120	140	160	180	200	220	240
1	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02
2	0.08	0.06	0.05	0.05	0.04	0.04	0.03	0.03
3	0.11	0.09	0.08	0.07	0.06	0.06	0.05	0.05
4	0.15	0.12	0.11	0.09	0.08	0.08	0.07	0.06
5	0.19	0.16	0.13	0.12	0.11	0.09	0.09	0.08
6	0.23	0.19	0.16	0.14	0.13	0.11	0.10	0.09
7	0.26	0.22	0.19	0.16	0.15	0.13	0.12	0.11
8	0.30	0.25	0.21	0.19	0.17	0.15	0.14	0.13
9	0.34	0.28	0.24	0.21	0.19	0.17	0.15	0.14
10	0.38	0.31	0.27	0.23	0.21	0.19	0.17	0.16

*Blood alcohol concentrations are expressed as percent, meaning grams of alcohol per 100 milliliters (per deciliter) of blood. Tables are adapted from those of the Pennsylvania Liquor Control Board, Harrisburg.

Drinking Patterns for Party Guests

Name(s) _____ Date _____

Guest 1 is a 120-pound female:

Hour	1	2	3	4
Number of drinks	2	1	1	0
BAC at start of hour	0.00			
BAC from table				
BAC (start + table)				
Alcohol broken down	-0.02	-0.02	-0.02	-0.02
BAC at end of hour				

Should Guest 1 drive home? _____

Guest 2 is a 180-pound male:

Hour	1	2	3	4
Number of drinks	2	2	1	0
BAC at start of hour	0.00			
BAC from table				
BAC (start + table)				
Alcohol broken down	-0.02	-0.02	-0.02	-0.02
BAC at end of hour				

Should Guest 2 drive home? _____

Drinking Patterns for Party Guests

Name(s) _____

Date _____

Guest 3 is a 160-pound female:

Hour	1	2	3	4
Number of drinks	3	2	0	0
BAC at start of hour	0.00			
BAC from table				
BAC (start + table)				
Alcohol broken down	-0.02	-0.02	-0.02	-0.02
BAC at end of hour				

Should Guest 3 drive home? _____

Guest 4 is a 160-pound male:

Hour	1	2	3	4
Number of drinks	0	0	3	2
BAC at start of hour	0.00			
BAC from table				
BAC (start + table)				
Alcohol broken down	0.00	0.00	-0.02	-0.02
BAC at end of hour				

Should Guest 4 drive home? _____

Drinking Patterns for Party Guests

Name(s) _____

Date _____

Guest 5 is a 140-pound male:

Hour	1	2	3	4
Number of drinks	3	2	1	0
BAC at start of hour	0.00			
BAC from table				
BAC (start + table)				
Alcohol broken down	-0.02	-0.02	-0.02	-0.02
BAC at end of hour				

Should Guest 5 drive home? _____

Guest 6 is a 220-pound male:

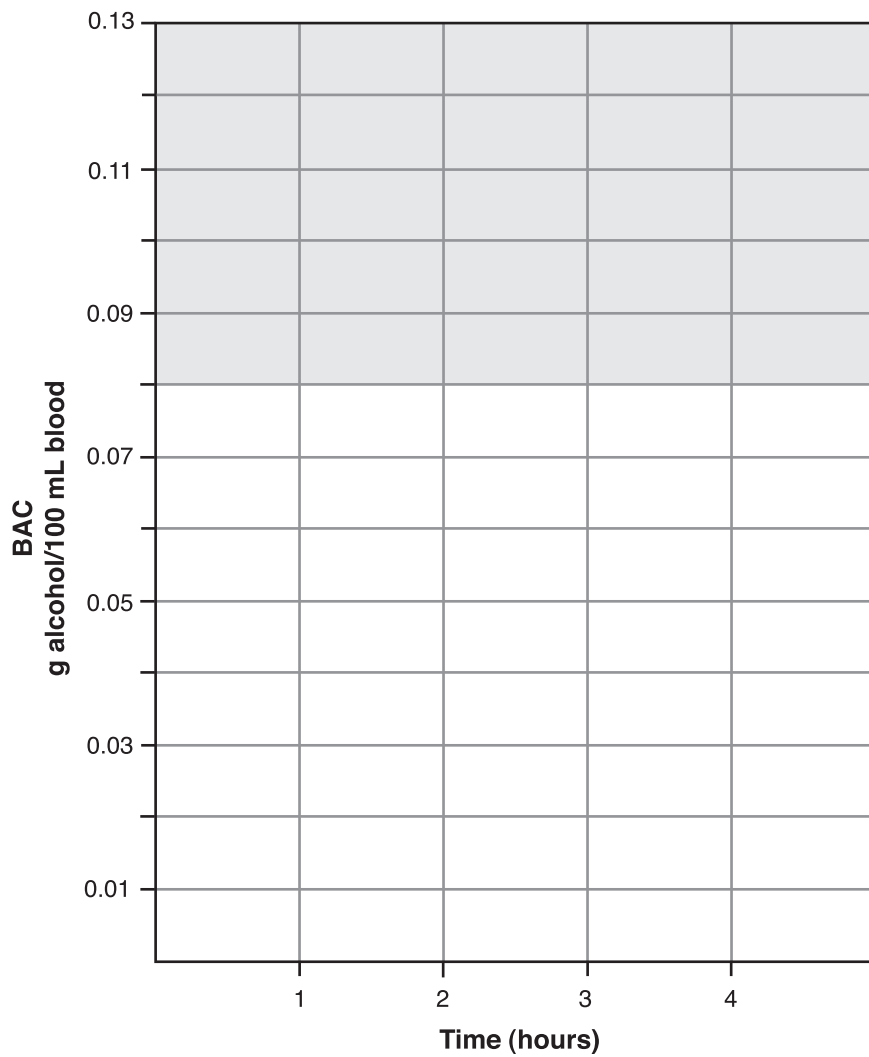
Hour	1	2	3	4
Number of drinks	3	2	1	0
BAC at start of hour	0.00			
BAC from table				
BAC (start + table)				
Alcohol broken down	-0.02	-0.02	-0.02	-0.02
BAC at end of hour				

Should Guest 6 drive home? _____

Blood Alcohol Concentration Graph Template

Name(s) _____

Date _____



Note: The shaded portion of the graph corresponds to BACs of 0.08 and above, which is the legal limit for driving in this activity.

Progressive Effects of Alcohol

Blood Alcohol Concentration	Changes in Feelings and Personality	Brain Regions Affected	Impaired Activities (continuum)
0.01 – 0.05	Relaxation Sense of well being Loss of inhibition	Cerebral cortex	Alertness Judgment Coordination
0.06 – 0.10	Pleasure Numbing of feelings Nausea, Sleepiness Emotional arousal	Cerebral cortex + forebrain	(especially fine motor skills) Visual tracking Reasoning and depth perception
0.11 – 0.20	Mood swings Anger Sadness Mania	Cerebral cortex + forebrain + cerebellum	Inappropriate social behavior (e.g. obnoxiousness)
0.21 – 0.30	Aggression Reduced sensations Depression Stupor	Cerebral cortex + forebrain + cerebellum + brain stem	Slurred speech Lack of balance Loss of temperature regulation
0.31 – 0.40	Unconsciousness Death possible Coma	Entire brain	Loss of bladder control Difficulty breathing
0.41 and greater	Death		Slowed heart rate

Source: Advisory committee and NIAAA scientists.

Issues to Think About

- The effect of alcohol on a person's physical abilities
- The effect of alcohol on a person's mental abilities
- The effect of alcohol on a person's risk of injury
- The effect of alcohol on the risk of injury to other people
- Positive effects of alcohol on a person or on society
- Economic costs or benefits of alcohol to an individual or to society

Alcohol Information Sheets

TYPES OF ALCOHOLS

Alcohols are a useful class of chemical compounds. The most common alcohols that we encounter in daily life are methanol (also called wood alcohol), isopropanol (rubbing alcohol), and ethanol (or ethyl alcohol). Of these three, only ethanol is safe to drink. Other alcohols are poisons. When the word *alcohol* is used in association with beverages, it always refers to ethanol.

Alcohols, including ethanol, are used by the chemical industry in many ways. Methanol is used as antifreeze, and isopropanol is the main ingredient of rubbing alcohol. Ethanol has many uses in addition to being a beverage ingredient. It is used as an alternative fuel source and as a solvent for other chemicals, including some medicines. For example, some types of cough syrup have ethanol concentrations similar to those found in hard liquor.

Alcohol Information Sheets

ALCOHOL AND SOCIETY

Adults drink alcoholic beverages for many reasons—to celebrate holidays, to celebrate good times, as an emotional release, and for cultural and religious reasons. The movies, television, and advertisements often promote alcohol as an almost required part of a happy and successful lifestyle.

Most adults who drink alcohol do so responsibly. However, the time and place where alcoholic beverages are consumed are important in determining how appropriate the drinking is. In the United States, it is common for people to drink at parties. For many people, BACs in the range of 0.01–0.05 help them feel more relaxed and friendly. At parties, drinking alcohol is acceptable, as long as guests don't drink too much. In other settings, drinking alcohol is a serious problem. For example, drinking and then driving a car can lead to crashes, and drinking at work can lead to serious accidents. Drinking alcohol while taking certain medications can produce serious health problems and even death.

Different cultures view drinking alcohol differently. Some cultures prohibit drinking altogether, while others include it as part of everyday living. In some countries, many people who drink do so with the intention of becoming intoxicated. Not surprisingly, different countries have different laws about the use of alcohol. The chart below lists the legal drinking age and legal BAC limit for driving in various countries.

Country	Minimum drinking age	Legal BAC limit for driving
Australia	18	0.05
Austria	16 for beer and wine, 18 for all types	0.05 0.01 for new drivers
Belgium	15	0.05
Canada	18–19 (depending on province)	0.08
Denmark	18	0.05
England	18	0.05
France	16	0.05
Germany	16 for beer and wine, 18 for all types	0.05
Italy	16	0.08
Japan	20	0.03
Russia	18	0.02
Spain	16	0.03–0.05 (depending on type of vehicle)
Sweden	18 for certain beers, 20 for all types	0.02–0.05 (depending on type of vehicle)

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ALCOHOL'S EFFECTS ON THE BRAIN

The brain, with its high water content, is very sensitive to the effects of alcohol. Low BAC levels affect a part of the brain called the cerebral cortex, producing a sense of relaxation and well being. People who drink moderate amounts of alcohol may have problems with certain mental activities, such as those involved with getting, storing, and using information. These effects can cause problems in school for young people and at work for adults.

At higher BACs, additional parts of the brain become affected, resulting in changes in feelings and personality as well as impaired activities. People who drink heavily and for a long time often show evidence of brain damage. If an alcoholic stops using alcohol, some brain damage can be reversed. Master 5.4, *Progressive Effects of Alcohol*, lists how increasing BACs affect the brain and describes the effects.

The effects of alcohol are not limited to the brains of those who drink but also extend to the developing brains of fetuses. Pregnant women who drink expose their unborn children to alcohol when it passes through the placenta. This exposure can lead to a birth defect known as fetal alcohol syndrome (FAS). Children born with FAS have a number of symptoms including mental retardation, developmental delays, and behavioral problems.

Animal studies have been used to understand how alcohol exposure causes FAS. If drinking occurs during the time when the developing brain is growing the fastest, then FAS is more likely to occur. A recent study suggested that a single exposure to high alcohol concentrations is enough to cause FAS in rats. Healthcare providers should warn pregnant women not to drink any alcohol during their pregnancy or if they are planning to become pregnant.

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ALCOHOL'S EFFECTS ON THE BODY

Alcohol and the Heart

Drinking alcohol affects the functioning of the heart and circulatory system. Studies have shown that small amounts of alcohol (about one drink per day for a woman and two drinks per day for a man) can reduce the risk of heart disease. The reason for this protective effect is not understood. Doctors do not recommend that nondrinkers start drinking to reduce their risk for heart disease, however; even moderate drinking increases the risk for other alcohol-related problems, including other medical problems, accidents, violence, and other risky behaviors. There is no question that heavy drinking is bad for the heart. It can damage heart tissue, produce an irregular heartbeat, and increase the risk of stroke.

Alcohol and the Liver

The liver is critical to our health. It helps break down food during digestion and processes waste so it can be excreted from the body. It also helps make needed substances such as cholesterol. Heavy drinking is often associated with liver damage. The liver is the main organ where alcohol is metabolized, or broken down, into different chemicals that can be passed out of the body. Some of these breakdown products are toxic to the liver. If these toxic substances build up in the liver, alcohol-induced liver damage can result. Women develop liver disease after a shorter time and with less alcohol exposure than men do.

Alcohol and the Digestive System

Heavy drinking can stop the esophagus from contracting and helping move food to the stomach. This allows stomach acids to back up into the esophagus. Stomach acid in the esophagus causes an inflammation of the cells, which can progress to esophageal cancer. Heavy alcohol use also is associated with inflammation of the pancreas and cancers in other body parts, including the mouth, throat, breast, colon, and rectum. Alcohol consumption apparently does not cause stomach cancer, but it may be involved in gastritis (inflammation of the stomach).

Alcoholics often have poor diets, so they don't get enough essential nutrients. Alcohol also interferes with the body's ability to break down food and absorb nutrients such as vitamins. Vitamin deficiencies can lead to other medical problems including softening of the bones and poor blood clotting.

Alcohol and Hormones

Hormones are chemical messengers in the body that coordinate the functions of tissues and organs. Alcohol can impair the functions of both the glands that release hormones and the tissues that respond to them. These effects can lead to problems regulating blood sugar, infertility, and osteoporosis (softening of bones).

Alcohol and Sleep

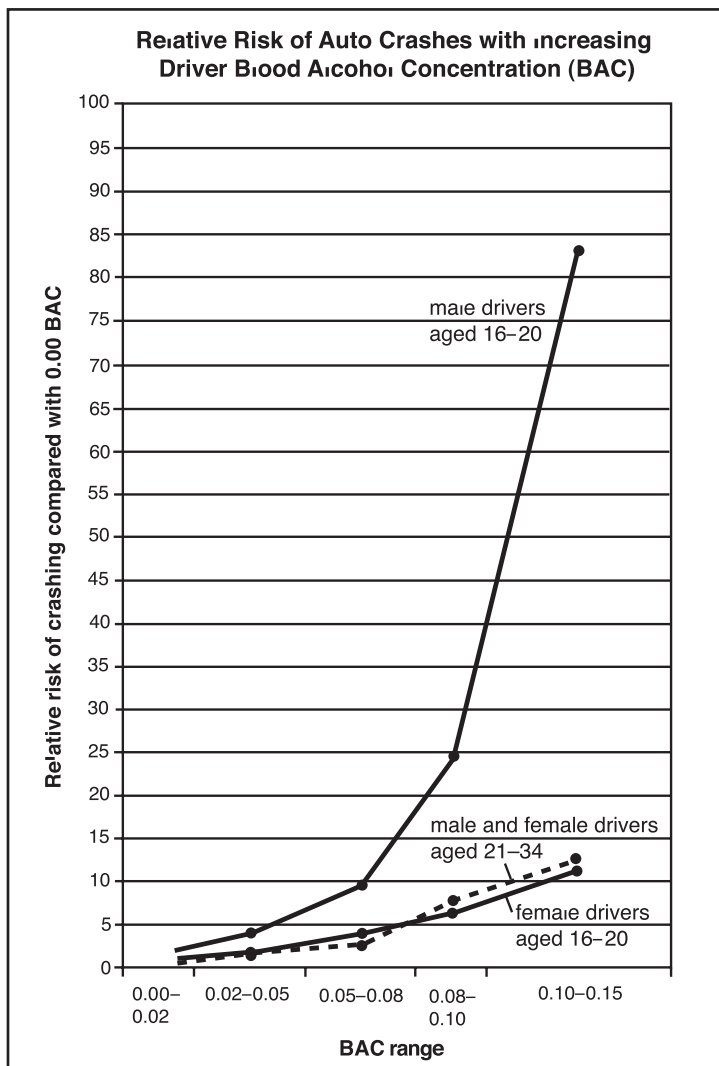
Sleep is important for good health. Many people think that alcohol will help them sleep better. In fact, alcohol can cause problems with sleeping. It interferes with the normal sleep pattern and may leave the person feeling tired and unrefreshed upon awakening.

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DRINKING AND DRIVING

Driving a car requires the driver to take in information from the environment and make many decisions about how to respond to all this information. Road conditions may be especially difficult to determine if it is dark, raining, or snowing. Roads that are narrow, have many curves, or have heavy traffic also challenge drivers.

In the United States, the legal BAC for driving is set at 0.08 or 0.10, depending on the state. The skills involved in driving are not all impaired at the same BAC. A driver's ability to divide attention between two or more sources of visual information can be impaired at a BAC of 0.02 or lower. When the BAC reaches 0.05 or higher, a person's reaction time slows, visual perception decreases, some steering tasks are impaired, eye movements slow, and glare on the windshield becomes more difficult to deal with.



The risk of a motor vehicle crash increases as the BAC increases. In addition to the amount of alcohol in the blood, the age of the driver is an important factor in determining the risk of a crash. The following graph illustrates how the risk of being in a crash increases as the BAC increases.

Alcohol is involved in about 30 percent of all traffic fatalities. In 1998, 12,663 people died in alcohol-related crashes in the United States. Of those killed, 35 percent were driving the car, 31 percent were passengers, and 11 percent were not in the vehicle.

If a person is arrested for driving under the influence of alcohol, several consequences may occur. The driver's license can be suspended or revoked. The vehicle can be impounded. If the driver has previous drunk-driving convictions, the driver may go to jail.

In addition to contributing to motor vehicle crashes on roads and highways, alcohol can impair the abilities of pilots and boaters. A pilot's abilities can be impaired for up to 14 hours after having a BAC between 0.10 and 0.12.

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ALCOHOL, AGGRESSION, AND VIOLENCE

Violence concerns all of us, whether it is violence against one's self, such as suicide; violence against another person, such as rape, homicide, domestic abuse (marital violence or child abuse); or violence against a group, such as riotous acts at a sporting event. Consuming alcohol can make a person more aggressive, to the point of violence. A violent behavior is defined as one that intentionally harms, or attempts to harm, another person physically. Aggressive behaviors, in addition to attempting to cause physical harm, are threatening, hostile, or harmful in a nonphysical way.

One study reported that 42 percent of violent crimes reported to the police involved alcohol. The following chart summarizes the extent to which alcohol is involved in various crimes.

Crime	Proportion involving alcohol
Murders	86%
Sexual crimes	60%
Assault	37%
Marital violence committed by men, by women	57% 27%
Child abuse	13%

A BAC between 0.01 and 0.05 can cause a lack of inhibitions and cause a person to make poor judgments. As the BAC rises to 0.06–0.10, a person may become more emotional. When the BAC increases to 0.11–0.20, the person may experience anger and act inappropriately in a social setting. For example, he or she may become loud and obnoxious in a crowd.

Alcohol by itself may not cause a person to commit a violent act; however, if a person who has consumed alcohol feels threatened or provoked, he or she may respond in a more severe way than if sober. Research suggests that alcohol may encourage aggression or violence by changing the way the brain works. Alcohol may make a person act more impulsively. People who have been drinking are more likely to engage in risky behaviors, including sexual behaviors. For example, surveys indicate that drinking is often associated with date rape. Drinking alcohol can also cause a person to misjudge other people's actions and overreact to a real or imagined threat. People who have been drinking alcohol can make poor decisions about how their aggressive actions can affect themselves or others.

Aggression and violence can also lead the victims to increase their consumption of alcohol, perhaps as a way to cope with the physical or emotional problems brought on by the violence.

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ALCOHOL AND RISKY BEHAVIORS

People under the influence of alcohol are more likely to engage in risky behaviors compared with people who are sober. Even BACs well below the legal limit for driving can reduce alertness and affect judgment. These same BACs also impair people's coordination. So, while alcohol makes people feel more confident and willing to participate in risky behaviors, it lessens their ability to control their body movements.

When we think about alcohol and risky behaviors, drinking-and-driving usually comes to mind. There are, however, a number of other risky behaviors that should be considered. For example, the same poor judgment and loss of coordination that can lead to car crashes also can lead to other types of accidents, such as falls. Workers who drink on the job put themselves and others at risk for injury.

Sexual activity is another example of risky behavior. Surveys of young people show that they are more likely to engage in sex if they have been drinking. Additionally, 22 percent of surveyed young men and 15 percent of young women said they were less likely to use protection if they had been drinking. Such unprotected sex not only can result in pregnancy, but it also leaves the participants at risk to sexually transmitted diseases, including AIDS.

Reasoning and coordination are affected more severely at higher BACs. In addition, BACs in the range of 0.20–0.30 may lead to a loss of body-temperature regulation. Every year, some people drink to the point of intoxication and climb into a hot tub to relax. The alcohol prevents their bodies from maintaining a healthy temperature. The body temperature continues to rise to the point where it can cause brain damage and even death.

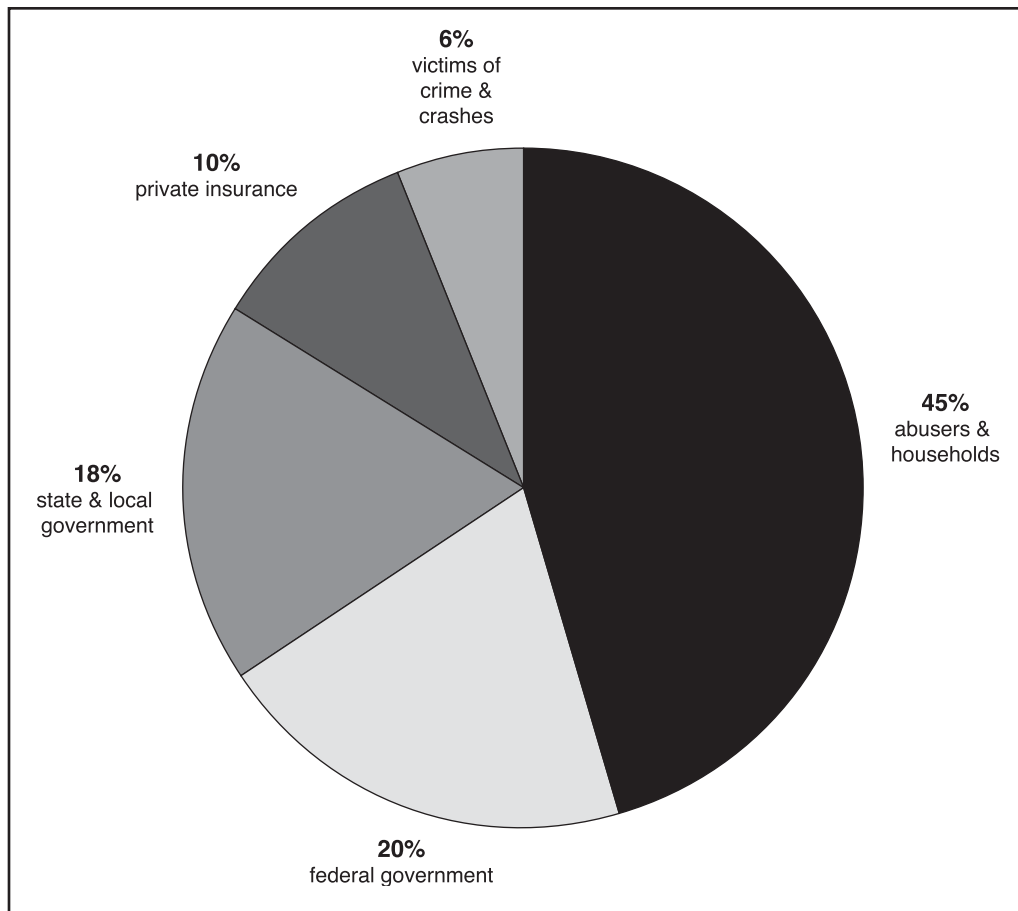
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ALCOHOL AND THE ECONOMY

The production, sale, and consumption of alcoholic beverages have many effects on the economy. On the positive side, the alcoholic-beverage industry creates thousands of jobs for farmers, factory workers, advertisers, truck drivers, and store clerks. Federal taxes on alcoholic beverages amounted to \$7.5 billion in 1995. State and local governments brought in even more tax revenue than the federal government.

Of course, alcohol abuse creates costs to society. About two-thirds of American adults drink an alcoholic beverage during the year. Most drink responsibly, but an estimated 13.8 million Americans have problems related to alcohol. In 1998, it was estimated that alcohol-abuse costs totaled over \$184 billion. These costs come from illness, premature death, car crashes, loss of productivity at work, higher insurance rates, and costs to the criminal justice system.

Many of the costs of alcohol abuse are paid for by the majority of people who do not abuse alcohol. Some of the costs of alcohol abuse, such as human suffering, cannot be expressed in dollars and are left out of this type of analysis. The following chart illustrates who in our society bears the costs of alcohol abuse.



Master 6.2h

Alcohol: Is This Right? What Do I Think Now?

Name _____

Date _____

Please circle whether you agree or disagree with each statement.

- | | | |
|---|-------|----------|
| 1. Alcohol is a stimulant. | Agree | Disagree |
| 2. Caffeine will sober you up. | Agree | Disagree |
| 3. Food will keep you from becoming intoxicated. | Agree | Disagree |
| 4. Drinking beer is safer than drinking wine or hard liquor such as vodka or whiskey. | Agree | Disagree |
| 5. Alcohol-related car crashes are all caused by drunk drivers. | Agree | Disagree |
| 6. Alcoholism is a disease. | Agree | Disagree |
| 7. Alcohol abuse and alcoholism affect only the abuser. | Agree | Disagree |
| 8. Alcohol abuse or alcoholism will never be my problem. | Agree | Disagree |
| 9. Nothing can be done about alcohol abuse or alcoholism. | Agree | Disagree |
| 10. It is a good idea to drink alcohol to prevent heart disease. | Agree | Disagree |
| 11. Drinking a large amount of alcohol occasionally is less harmful than drinking a smaller amount every day. | Agree | Disagree |
| 12. Drinking alcohol makes you feel more confident. | Agree | Disagree |

Alcohol: Is This Right?

Class Responses

	Agreed at beginning	Agreed at end
1. Alcohol is a stimulant.	_____	_____
2. Caffeine will sober you up.	_____	_____
3. Food will keep you from becoming intoxicated.	_____	_____
4. Drinking beer is safer than drinking wine or hard liquor such as vodka or whiskey.	_____	_____
5. Alcohol-related car crashes are all caused by drunk drivers.	_____	_____
6. Alcoholism is a disease.	_____	_____
7. Alcohol abuse and alcoholism affect only the abuser.	_____	_____
8. Alcohol abuse or alcoholism will never be my problem.	_____	_____
9. Nothing can be done about alcohol abuse or alcoholism.	_____	_____
10. It is a good idea to drink alcohol to prevent heart disease.	_____	_____
11. Drinking a large amount of alcohol occasionally is less harmful than drinking a smaller amount every day.	_____	_____
12. Drinking alcohol makes you feel more confident.	_____	_____